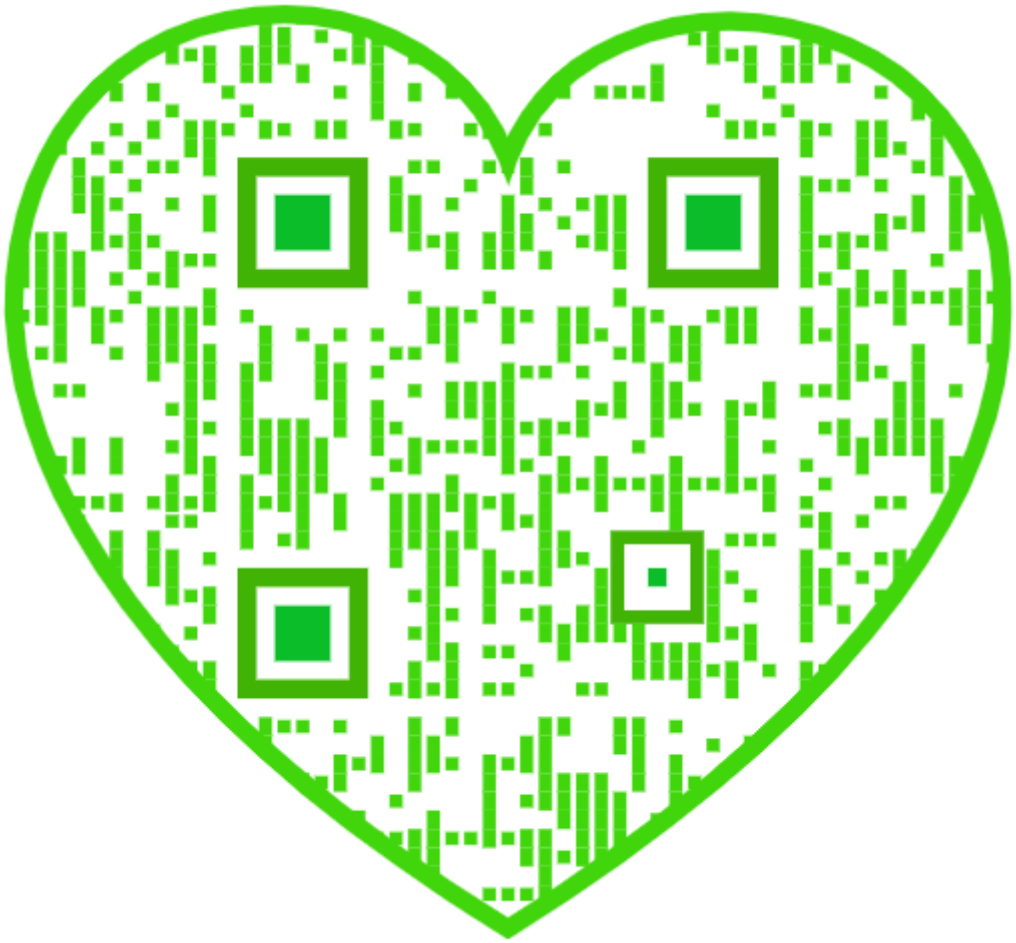
# RECIPES FOR FLINT GLASS MAKING

PUBLISHED AT THE OFFICES OF
THE POTTERY GAZETTE



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# Recipes

for

# Flint Glass Making

By a

British Glass Master and Mixer

Being Leaves from the Mixing Book of Several Experts in the Flint Glass Trade

Containing up-to-date Recipes and Valuable Information as to Crystal, Demi-crystal and Coloured Glass in its Many Varieties

It Contains the Recipes for Cheap Metal suited to Pressing, Blowing, etc., as well as the most costly Crystal and Ruby

British Manufacturers have kept up the Quality of this Glass from the Arrival of the Venetians to Hungry Hill, Stourbridge, up to the Present Time

The Book also contains Remarks as to the Result of the Metal as it left the Pots by the respective metal mixers, taken from their own Memoranda upon the Originals

**SECOND EDITION**

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"THE POTTERY GAZETTE" OFFICES

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## NOTES BY THE COMPILER.

Repeats are given of more than one recipe, so that the mixer may acquaint himself how to use up his cullet or to vary his mixture to suit his requirements.

The cost given of the cheap metal is based on the cost of materials some year or two ago, but it is approximately correct at the present time.

The sand used in most of the recipes is French (Fontenbleu), except in some old forms, when it was Isle of Wight; and the soda supplied by a Northwich firm.

Colouring should generally be about half put into the batch and the other half reserved until the long proof has been taken off, when it can be added to or diminished to suit furnace or the weather.

The sand in the *crystal* should be washed and calcined. In the commoner metal it is used as it arrives; still the quality is greatly improved by the first process.

Many of the finest colours containing cryolite should be worked immediately it is plain.

In using brass, it is necessary to insure correctness that it should always be the same. Brass differs in its composition.

The greatest care should be taken in the purity of all material, and the greatest care should be taken that everything is clean and free from dust and dirt.

In all these colourings allowance must be made throughout this book for the state of the furnace, weather, purity of sand and material, etc.

*July*, 1900.

19019

## RUBY.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| French Sand (Fontenbleu) | 2 | 2 | 20 | 0 |
| Red Lead - - - | 2 | 2 | 20 | 0 |
| Saltpetre - - - | 0 | 0 | 18 | 0 |
| Antimony - - - | 0 | 0 | 9 | 0 |
| Manganese - - - | 0 | 0 | 2 | 0 |
| Gold in Solution, "Purple Precipitate of Cassius" | 0 | 0 | 0 | $1\frac{1}{2}$ |
| Nitric Acid - - - | 0 | 0 | 0 | 1 |
| Muriatic Acid - - - | 0 | 0 | 0 | 4 |

"Mix and then add the gold; when fine, work into lumps. There used to be much difficulty in preparing this purple precipitate, but it is now an article of commerce. Mind it is pure."

## ANOTHER RUBY.

| | |
|---|---|
| Sand - - - - - | 32 lb. |
| Red Lead - - - - | 36 ,, |
| Saltpetre - - - - | 16 ,, |
| Manganese - - - - | $1\frac{3}{4}$ oz. |
| Antimony - - - - | 2 ,, |
| Gold (in Solution) - - - | 1 ,, |

---

## ANOTHER RUBY.

| | |
|---|---|
| Saltpetre - - - - | $9\frac{1}{2}$ lb. |
| Sand - - - - - | 18 ,, |
| Red Lead - - - - | 23 ,, |
| Red Lump Cullet - - | 11 ,, |
| "Waste Last Pot" - - | 6 ,, |
| Manganese - - - | $2\frac{1}{2}$ oz. |
| Antimony - - - - | 1 ,, |
| Gold (Precipitated) - - | 5 drams. |

"Very good pot as ever was made. Beautiful colour. Put colour in the middle of the pot."

## ANOTHER RUBY.

| | |
|---|---|
| Saltpetre - - - - | 16 lb. |
| Sand - - - - - | 32 ,, |
| Red Lead - - - - | 36 ,, |
| Manganese - - - - | $1\frac{3}{4}$ oz. |
| Antimony - - - - | 2 ,, |
| Gold (Precipitated) - - - | 1 ,, |

"This mixture turned immediately it was put into the lear. Fill the pot for ruby a little at a time, and watch that it does not ferment. It does not require above twenty hours to fine ; and mind the pot does not get too hot. When it is worked into lumps, put it into the lear with some fine ashes. Keep it turned often, and when a dark ruby get it down the lear ; if it be not all dark, it will right itself in the plating. The metal from the pot should be a light straw colour."

## A RUBY FROM COPPER.

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| Sand - - - - - | 4 | 2 | 0 |
| Pearl Ashes - - - | 1 | 0 | 24 |
| Red Lead - - - - | 0 | 3 | 16 |
| Carbonate of Lime - - | 0 | 0 | 25 |
| Phosphate of Lime - - | 0 | 0 | 5 |
| Red Tartar (Crude Tartar) | 0 | 0 | 5 |
| Borax - - - - | 0 | 0 | 5 |
| Oxide of Tin - - - | 0 | 0 | $3\frac{1}{2}$ |
| Red Oxide of Copper - | 0 | 0 | $2\frac{1}{2}$ |

"Give it all the air you can, compatible with getting it plain; too great heat is against it."

## FLINT FOR USING WITH THE RUBY FOR COATING (on pages 2 and 3).

| | |
|---|---|
| Sand - - - - - | 64 lb. |
| Lead - - - - - | 72 ,, |
| Saltpetre - - - - | 32 ,, |
| Manganese - - - - | 1¼ oz. |

"Charge your pot with two-thirds and 'dragade' it; next morning charge again with the rest and the ladings, and add 4 oz. manganese and 8 oz. of antimony."

## A GERMAN METAL (Flint).

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| French Sand - - - | 10 | 0 | 0 |
| Refined Soda - - - | 1 | 2 | 0 |
| Common Soda Ash - - | 3 | 2 | 0 |
| Lime Spar - - - | 1 | 0 | 0 |
| Fluor Spar - - - | 0 | 2 | 0 |
| Nitrate of Soda - - | 1 | 0 | 0 |

"Sand unburnt and unwashed. This mixture is given to form th body of some of the following coloured metals, and is called 'German cullet or body'. These delicate colours require great care."

## CORNELIAN, OR ALABASTER.

| | |
|---|---|
| German Cullet (page 6) - - | 35 lb. |
| Black Ash - - - - | 15 oz. |
| Nitrate of Soda - - - | 8 ,, |
| Manganese - - - - | 1 ,, |

"This way very good."

---

## ANOTHER CORNELIAN.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| German Cullet (page 6) - | 4 | 1 | 0 | 0 |
| Black Ash - - - | 0 | 0 | 11 | 0 |
| Nitrate of Soda - - | 0 | 0 | 7 | 0 |
| Manganese - - - | 0 | 0 | 0 | 15 |

"Very good."

## SAPPHIRE BLUE.

| | |
|---|---|
| German Cullet (page 6) - - | 14 lb. |
| Black Ash - - - - | $5\frac{1}{2}$ ,, |
| Nitrate of Soda - - - | $3\frac{1}{2}$ ,, |
| Copper Scales - - - | 2 oz. |

"Very good."

---

## ANOTHER SAPPHIRE BLUE.

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| German Cullet (page 6) - | 3 | 1 | 0 |
| Black Ash - - - - | 0 | 0 | 11 |
| Nitrate of Soda - - - | 0 | 0 | 8 |
| Copper Scales - - - | 0 | 0 | $3\frac{1}{4}$ |
| Blue Cullet - - - - | 1 | 0 | 0 |

"Filled an overtaker. Very good."

---

## ANOTHER SAPPHIRE BLUE.

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| German Cullet (page 6) - | 2 | 3 | 0 |
| Cullet - - - - - | 1 | 2 | 0 |
| Nitrate of Soda - - - | 0 | 0 | 7 |
| Copper Scales - - - | 0 | 0 | $2\frac{1}{2}$ |

"Very good."

## CRYSOPHIS.

| | Lb. | oz. | drs. |
|---|---|---|---|
| German Cullet (page 6) - | 14 | 0 | 0 |
| Black Ash - - - - | 0 | 5½ | 0 |
| Nitrate of Soda - - - | 0 | 3½ | 0 |
| Uranium (Oxide) - - | 0 | 2 | 0 |
| Green Oxide of Chrome - | 0 | 0½ | 8 |
| Sulphide of Copper - - | 0 | 0 | 3 |

"Very good."

## ANOTHER CRYSOPHIS.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| German Cullet (page 6) | 2 | 2 | 0 | 0 |
| Crysophis Cullet - - | 1 | 3 | 0 | 0 |
| Saltpetre - - - | 0 | 0 | 11 | 0 |
| Oxide Uranium - - | 0 | 0 | 2½ | 0 |
| Sulphate of Copper | 0 | 0 | 0 | 10 |

"Very good."

## OPAL.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| Sand - - - - | 2 | 0 | 0 | 0 |
| Lead - - - - | 0 | 3 | 0 | 0 |
| Ash - - - - | 0 | 2 | 0 | 3 |
| Plaster of Paris - - | 0 | 2 | 0 | 0 |
| Lime Spar - - - | 0 | 0 | 14 | 0 |
| Manganese - - - | 0 | 0 | 0 | 3 |
| Nitrate of Soda - - | 0 | 0 | 7 | 0 |
| Arsenic - - - - | 0 | 0 | 0 | 8 |

---

## ANOTHER OPAL.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| Sand - - - - | 2 | 2 | 0 | 0 |
| Lead - - - - | 1 | 1 | 0 | 0 |
| Ash - - - - | 1 | 0 | 11 | 0 |
| Fluor Spar - - - | 0 | 1 | 24 | 0 |
| Felspar - - - - | 0 | 1 | 24 | 0 |
| Saltpetre - - - | 0 | 0 | 12 | 0 |
| Manganese - - - | 0 | 0 | 0 | 5 |

"Very good."

## ANOTHER OPAL.

| | |
|---|---|
| Sand | 100 lb. |
| Lead | 80 ,, |
| Ash | 28 ,, |
| Saltpetre | 30 ,, |
| Calcined Bones | 20 ,, |
| Antimony | 4 oz. |

## ANOTHER OPAL.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| Sand | 3 | 3 | 12 | 0 |
| Cryolite | 0 | 3 | 16 | 0 |
| Lead | 0 | 1 | 5 | 0 |
| Soda | 0 | 3 | 16 | 0 |
| Nitrate of Soda | 0 | 0 | 13 | 0 |
| Arsenic | 0 | 0 | 2 | 0 |
| Manganese | 0 | 0 | 0 | 3 |

## "BEST" OPAL.

| | |
|---|---|
| Sand | 600 lb. |
| Soda | 240 ,, |
| Felspar | 225 ,, |
| Fluor Spar | 225 ,, |
| Arsenic | 6 ,, |
| Cryolite | 5 ,, |
| Nitrate of Soda | 65 ,, |

## ANOTHER OPAL.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| Sand | 1 | 3 | 20 | 0 |
| Cryolite | 0 | 1 | 22 | 0 |
| Ash | 0 | 0 | 20 | 0 |
| Red Lead | 0 | 0 | 20 | 0 |
| Soda | 0 | 1 | 22 | 0 |
| Nitrate of Soda | 0 | 0 | 8 | 0 |
| Arsenic | 0 | 0 | 1 | 0 |
| Manganese | 0 | 0 | 0 | $1\frac{1}{2}$ |

## ANOTHER OPAL.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| French Sand | 6 | 1 | 0 | 0 |
| Lead | 4 | 0 | 22 | 0 |
| Ash (Pot) | 3 | 1 | 6 | 0 |
| Fluor Spar | 1 | 1 | 12 | 0 |
| Felspar | 1 | 1 | 12 | 0 |
| Saltpetre | 0 | 1 | 8 | 0 |
| Manganese | 0 | 0 | 0 | 14 |

## ANOTHER OPAL.

| | |
|---|---|
| Sand | 150 lb. |
| Soda | 60 ,, |
| Nitrate of Soda | 5 ,, |
| Barytes | 13 ,, |
| Arsenic | 8 oz. |
| Manganese | 5 ,, |

"This was changed into blue by adding oxide of cobalt, 4 oz., and about 40 lb. of blue cullet."

## ANOTHER OPAL.

| | |
|---|---|
| Sand | 700 lb. |
| Red Lead | 470 ,, |
| Ash (Marshall's) | 370 ,, |
| Felspar | 152 ,, |
| Fluor Spar | 152 ,, |
| Saltpetre | 36 ,, |
| Manganese | 14 oz. |

## ANOTHER OPAL.*

| | |
|---|---|
| Sand | 600 lb. |
| Soda (B., M. & Co.) | 240 ,, |
| Felspar | 225 ,, |
| Fluor Spar | 225 ,, |
| Arsenic | 6 ,, |
| Cryolite | 5 ,, |
| Nitrate of Soda | 65 ,, |

## TURQUOISE BLUE.

| | |
|---|---|
| Sand | 100 lb. |
| Red Lead | 80 ,, |
| Saltpetre | 28 ,, |
| Ash | 28 ,, |
| Calcined Bones | 18 ,, |
| Arsenic | 4 ,, |
| Brass Filings | 1½ ,, |

## ANOTHER TURQUOISE.

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| Batch | 0 | 1 | 12 |
| Turquoise Cullet | 3 | 0 | 0 |
| Oxide of Iron | 0 | 0 | 1 |
| Copper Scales | 0 | 0 | 2 |
| Opal Cullet | 0 | 1 | 12 |

"Very good, very soft, not regular batch; work immediately it is fine; last instruction important."

## ANOTHER TURQUOISE.

| | |
|---|---|
| Batch (A, page 22) - - | 504 parts. |
| Plaster of Paris - | 14 ,, |
| Fluor Spar - - - | 24 ,, |
| Felspar - - - - | 24 ,, |
| Arsenic - - - - | 6 ,, |
| Black Oxide of Copper - | 9 ,, |
| Black Oxide of Cobalt - | $2\frac{3}{4}$ oz. |
| Phosphate of Lime - - | 9 parts. |

---

## ANOTHER TURQUOISE.

| | |
|---|---|
| Opal Batch (* page 13) - - | 28 lb. |
| Arsenic - - - - - | 4 oz. |
| Zaffer - - - - - | $1\frac{1}{2}$ ,, |
| Brass - - - - - | 12 ,, |
| Cullet (Turquoise) - - - | 70 lb. |

## GOLD COLOUR.

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| Sand - - - - - | 1 | 1 | 0 |
| Soda - - - - - | 0 | 2 | 4 |
| Spar - - - - - | 0 | 0 | 25 |
| Calcined Oats - - - | 0 | 0 | 1 |

"Good and right."

---

## ANOTHER GOLD COLOUR.

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| Amber Cullet - - - | 3 | 0 | 0 |
| Batch (A, page 22) - - | 0 | 3 | 0 |
| Calcined Oats - - - | 0 | 0 | $\frac{3}{4}$ |

"Very good. You may calcine your own oats in the lear or furnace. Sometimes ground and sifted coke is used, but it is not so pure a carbon."

## DARK GREEN.

| | |
|---|---|
| Cullet - - - - - | 112 lb. |
| Batch (A, page 22) - - | 336 ,, |
| Crocus Marcus - - - | 13 ,, |
| Copper Scales - - - | 4 ,, |
| Oxide of Copper - - - | 3 oz. |

"Very good."

---

## ANOTHER GREEN (Common).

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| Green Cullet - - - | 1 | 0 | 0 | 0 |
| Batch (A, page 22) - | 0 | 2 | 24 | 0 |
| Oxide of Iron - - | 0 | 0 | 4 | 0 |
| Copper Scales - - | 0 | 0 | 1 | 0 |
| Oxide of Copper - - | 0 | 0 | 0 | 1 |

## GREEN FOR MALACHITE.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| Green Cullet - - - | 1 | 0 | 0 | 0 |
| Green Siftings - - | 0 | 3 | 0 | 0 |
| Batch (A, page 22) - | 0 | 2 | 24 | 0 |
| Oxide of Iron - - - | 0 | 0 | 4 | 0 |
| Copper Scales - - | 0 | 0 | 1 | 0 |
| Oxide of Copper - - | 0 | 0 | 0 | 2 |

"Very good."

## BLUE FOR MALACHITE.

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| Batch (A, page 22) - | 3 | 2 | 0 | 0 |
| Blue Cullet - - - | 1 | 0 | 0 | 0 |
| Zaffer - - - | 0 | 0 | 5 | 0 |
| Manganese - - - | 0 | 0 | 0 | 8 |

## BLACK FOR MALACHITE.

Use Batch A, page 22, and treat it as Crystal Batch on page 19, and this will produce a black metal which will incorporate with the blue and green metal above, and will anneal safely.

"These three colours will work mixed from the pots; one gathered upon the other and manipulated on the 'marver,' then pressed, or melted in again in the furnace and blown; anneal them well."

## BLACK.

| | |
|---|---|
| Batch (Crystal Batch) | 56 lb. |
| Flint Cullet | 56 ,, |
| Manganese | 12 ,, |
| Iron Scales | 3 ,, |

"A good pot of black which was not greasy."

## COMMON CANARY BATCH.

| | |
|---|---|
| Sand | 1,100 lb. |
| Ash | 336 ,, |
| Spar | 264 ,, |
| Lead | 100 ,, |
| Nitrate of Soda | 40 ,, |
| Arsenic | 6 ,, |
| Oxide Uranium | 4½ ,, |

## CANARY.

| | |
|---|---|
| Batch (as above) | 14 lb. |
| Uranium | 1 oz. |
| Sulphate of Copper | ¾ ,, |

"This gives the proportion of colourings to 14 lb. batch."

## ANOTHER CANARY.

| | |
|---|---|
| Batch (as above) | 336 lb. |
| Canary Cullet | 100 ,, |
| Oxide Uranium | 14 oz. |

## WHITE OPAQUE GLASS.

| | |
|---|---|
| Sand - - - - | 100 parts. |
| Calcined Ash - - - | 50 ,, |
| Slacked Lime - - - | 16 ,, |
| Oxide of Tin - - - | 60 ,, |

---

## ANOTHER WHITE OPAQUE GLASS.

| | |
|---|---|
| Sand - - - - | 100 parts. |
| Minium - - - - | 78 ,, |
| Calcined Ash - - - | 30 ,, |
| Nitrate of Soda (Crystals) | 8 ,, |
| White Oxide of Tin - - | 62 ,, |

"These will be interesting, as they are from a very old book of recipes."

## SEALING WAX—RED—(Experiment).

| | |
|---|---|
| Saltpetre - - - - - | 3 lb. |
| Lead - - - - - | 6 ,, |
| Sand - - - - - | 9 ,, |
| "Raw Brass" - - - - | 1 ,, |
| "Colclother of Vitriol" - - | 1 ,, |
| Red Tartar - - - - | 1 ,, |

"Was a wax red, but faded. Wanted working when plain, probably."

---

## ANOTHER WAX—RED.

| | |
|---|---|
| Cullet (out of the above experiment) - - - - | 20 lb. |
| Added—Red Tartar - - | 2 ,, |
| Brass - - - - - | 8 oz. |
| Colcothar of Vitriol - - | 1 lb. |

"This produced a good wax red after being in the furnace twelve hours. The colour was throughout very good."

## FLINT (A)—(A very cheap Metal).

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| Sand - - - - | 12 | 2 | 0 | 0 |
| Alkali (B., M. & Co.) - | 4 | 1 | 0 | 0 |
| Ash (Marshall's) - - | 0 | 3 | 18 | 0 |
| Spar - - - - | 1 | 0 | 8 | 0 |
| Barytes - - - | 0 | 3 | 14 | 0 |
| Nitrate of Soda - - | 0 | 2 | 18 | 0 |
| Arsenic - - - | 0 | 0 | 5 | 0 |
| Manganese (about) - | 0 | 0 | 1 | 14 |

"Costs about 2s. 8d. per cwt. into pot. (Evaporation 13 to 15 per cent.)"

---

## A BATCH (B)—(A little more costly).

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| Sand - - - - - | 12 | 0 | 0 |
| Soda (B., M. & Co.) - - | 4 | 1 | 0 |
| Lead - - - - - | 0 | 1 | 0 |
| Spar - - - - - | 1 | 0 | 0 |
| Nitrate of Soda - - - | 0 | 2 | 0 |
| Saltpetre - - - - | 0 | 2 | 0 |
| Arsenic - - - - | 0 | 0 | 2 |
| Manganese - - - | 0 | 0 | $1\frac{1}{4}$ |

"Costs about 3s. 2d. per cwt."

## FLINT GLASS (Crystal and Demi).*

| | |
|---|---|
| Refined Pearl Ashes | 76 lb. |
| Saltpetre | 10 ,, |
| Lead | 200 ,, |
| Sand | 260 ,, |
| Manganese | 4 drs. |
| Arsenic | 8 lb. |

* Nearly every house in Britain uses different proportions, but we give a variety. The costs will be apparent to the mixer.

---

## ANOTHER CRYSTAL FLINT GLASS.

| | Best. | Common. |
|---|---|---|
| Sand | 560 lb. | 500 lb. |
| Lead | 330 ,, | 350 ,, |
| Ash | 160 ,, | 150 ,, |
| Saltpetre | 60 ,, | 30 ,, |
| Arsenic | 1 ,, | 1 ,, |

---

## ANOTHER CRYSTAL FLINT GLASS.

| | |
|---|---|
| Sand | 520 lb. |
| Lead | 360 ,, |
| Ash | 160 ,, |
| Saltpetre | 35 ,, |

"Colouring."

## ANOTHER FLINT (C).

| | Cwt. | qrs. | lb. | oz. |
|---|---|---|---|---|
| Sand - - - - | 12 | 2 | 0 | 0 |
| Alkali (B., M. & Co.) - | 4 | 1 | 0 | 0 |
| Ash (Marshall's) - - | 0 | 3 | 18 | 0 |
| Spar - - - - | 1 | 0 | 8 | 0 |
| Barytes - - - | 0 | 3 | 14 | 0 |
| Nitrate of Soda - - | 0 | 2 | 18 | 0 |
| Arsenic - - - | 0 | 0 | 5 | 0 |
| Manganese - - - | 0 | 0 | 1 | 14 |

"Costs about 3s. 7¼d. per cwt. Very good. Evaporation 13 to 15 per cent."

---

## ANOTHER FLINT (D).

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| Sand - - - - - | 12 | 0 | 0 |
| Soda (B., M. & Co.) - - | 4 | 0 | 0 |
| Nitrate of Soda - - - | 1 | 0 | 0 |
| Ash - - - - - | 0 | 1 | 0 |
| Lead - - - - - | 0 | 1 | 0 |
| Spar - - - - - | 1 | 0 | 0 |
| Arsenic - - - - | 0 | 0 | 7 |
| Manganese - - - | 0 | 0 | 1 |

"Costs about 2s. 10d. per cwt. Evaporation 13 to 15 per cent."

## **FLINT** (a good blowing Metal).

| | Cwt. | qrs. | lb. |
|---|---|---|---|
| Sand - - - - - | 12 | 0 | 0 |
| Alkali - - - - | 4 | 0 | 0 |
| Lead - - - - - | 1 | 0 | 0 |
| Saltpetre - - - - | 1 | 0 | 0 |
| Spar - - - - - | 1 | 0 | 0 |
| Ash - - - - - | 0 | 2 | 0 |
| Arsenic - - - - | 0 | 0 | 5 |
| Manganese - - - | 0 | 0 | 2 |
| Cobalt - - - - | 11 grs. | | |

"Costs about 4s. 6d. per cwt."

## ACHROMATIC GLASS.

| | |
|---|---|
| Lead - - - - - | 500 lb. |
| Sand - - - - - | 600 ,, |
| Ashes (Refined) - - - | 180 ,, |
| Saltpetre - - - - | 60 ,, |
| Manganese - - - - | 7 oz. |
| Antimony - - - - | 3 ,, |

"This is the right quantity."

---

## PASTE GLASS.

Furnace let out, and pots allowed to cool.

| | |
|---|---|
| Refined Pearl Ashes - | 97 parts. |
| Lead - - - - - | 200 ,, |
| Sand - - - - - | 260 ,, |
| Saltpetre - - - - | 10 ,, |
| Manganese - - - | $\frac{1}{2}$ oz. |
| Arsenic - - - - | 12 ,, |

"The paste was very good. The foundering was kept twenty-four hours longer, but the furnace was kept little hotter than a working furnace, and was then let out gradually, being kept for twelve hours little better than a pot arch. This paste was perfect to the bottom of the pot when broken up."

## WHITE ENAMEL.

| | |
|---|---|
| Sand - - - - - | 50 lb. |
| Saltpetre - - - - | 20 ,, |
| Lead - - - - - | 50 ,, |
| Arsenic - - - - | 4½ ,, |
| Antimony - - - - | ½ ,, |

"A very good pot of white, and worked clear."

## FIRESTONE.

| | |
|---|---|
| Sand - - - - - | 125 lb. |
| Saltpetre - - - - | 30 ,, |
| Lead - - - - - | 150 ,, |
| Arsenic - - - - | 7½ ,, |
| Antimony - - - - | ½ , |

"This was a pot of very good firestone."

## DEAD WHITE (for Moons).

| | |
|---|---|
| Sand | 28 lb. |
| Lead | 21 ,, |
| Ashes | 11 ,, |
| Arsenic | 2½ oz. |
| White Cullet | 200 lb. |

"A very good pot. Worked clear and well."

---

## WHITE AGATE.

| | |
|---|---|
| Sand | 24 lb. |
| Lead | 25 ,, |
| Saltpetre | 15 ,, |
| Calcined Bone Ash | 1 ,, |
| Arsenic | 4 ,, |

---

## ANOTHER AGATE.

| | |
|---|---|
| Sand | 67 lb. |
| Lead | 54 ,, |
| Ash | 20 ,, |
| Saltpetre | 11 ,, |
| Arsenic | 6 ,, |
| Bone Ash | 10 ,, |

"Very good."

## CANARY.

| | |
|---|---|
| Sand - - - - - | $5\frac{1}{4}$ parts. |
| Lead - - - - - | $3\frac{1}{2}$ ,, |
| Ash - - - - - | $1\frac{1}{8}$ ,, |
| Saltpetre - - - - | $\frac{1}{2}$ ,, |
| Oxide Uranium - - - | $\frac{1}{3\,5\,8}$ ,, |

"No arsenic. No manganese. Well mixed in a clean harbour. As a rule it takes 5 oz. of uranium to the cwt. Don't use the blacks from the iron when you use the cullet. This is a very tender colour to make."

---

## CANARY ENAMEL.

| | |
|---|---|
| To Blacks (Cullet) - - | 100 lb. |
| Use Chromate of Lead - - | $\frac{3}{4}$ ,, |

"Dissolve any quantity of lead (sugar of lead) in warm water; dissolve chromate of potash in warm water; put the one into the other by degrees, stirring all the while with a glass rod till no more precipitate falls; strain off the liquid and wash the precipitate which is chromate of lead; filter it, and it is fit for use. Don't use the chromate of lead of commerce; it is not pure."

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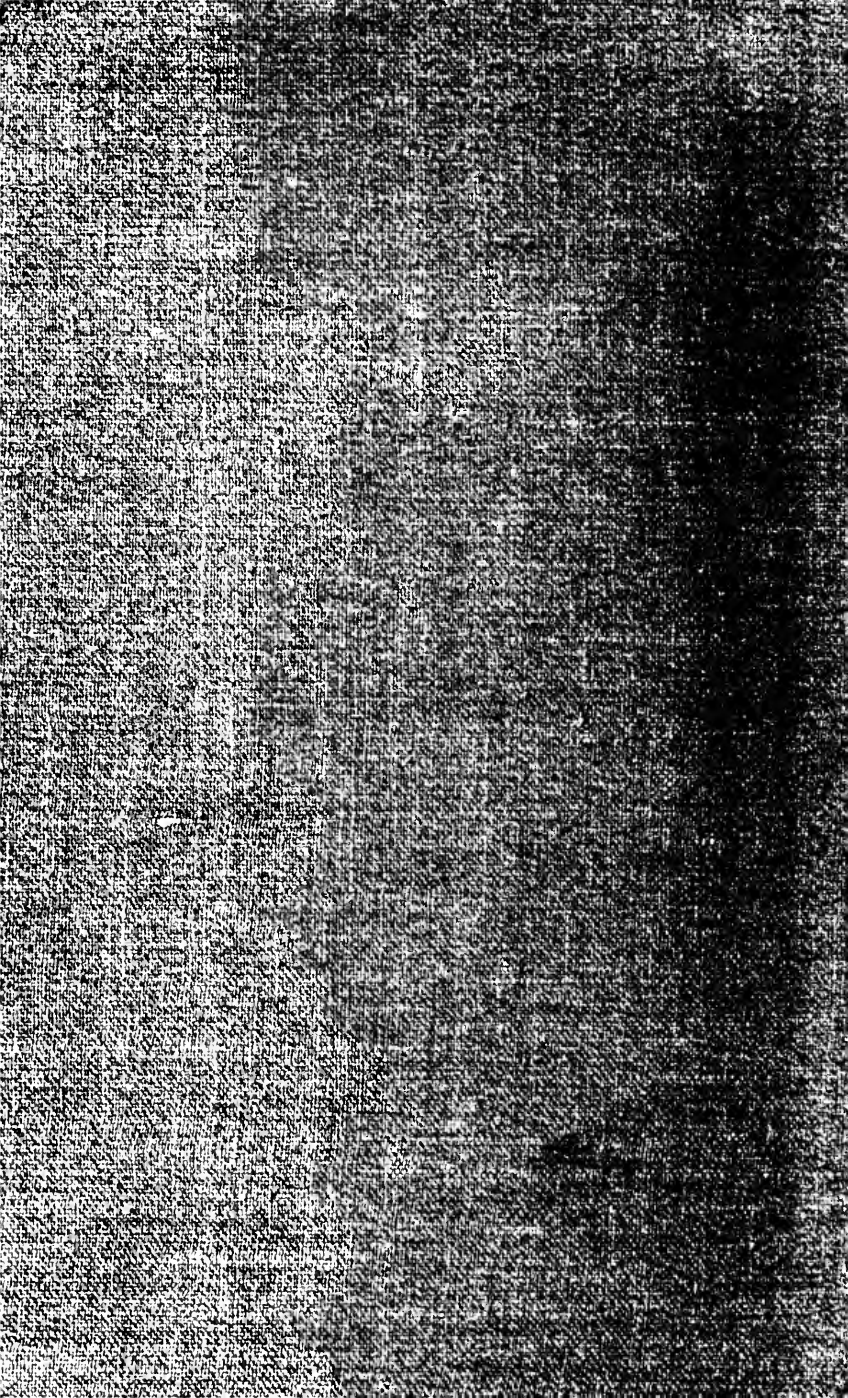
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